GrummanWorld

Volume 6, Number 9 May 8, 1987

Postal Service Accepts Grumman's First LLVs

'New workhorse' to deliver twice the capacity and three times the life of Service's Jeeps

WASHINGTON, D.C., April 29, 1987 — The United States Postal Service introduced Grumman's first six Long Life Vehicles today.

Postmaster General Preston Tisch and Grumman Vice Chairman of Development Dan Huebner spoke at the ceremony marking the acceptance of these vehicles. Under a $1.1 billion contract, Grumman will build 99,150 postal vehicles over the next six years at its Allied facility in Montgomery, Pennsylvania.

The gleaming white half-ton vans drove in front of the headquarters building here on L'Enfant Plaza. About 100 people were watching as the LLVs turned in formation and parked behind the speakers. "It reminds me of the Blue Angels on the runway," said Huebner.

With General Motors chassis, these aluminum-bodied vehicles will replace the Postal Service's aging fleet of Jeeps, half-ton vans and other similar delivery vehicles.

"Although the Grumman postal van will have twice the capacity of the current quarter-ton Jeeps, this aluminum van will have greater fuel economy and have a rust resistant body," Huebner said. "Even after replacing the engine and transmission in about 12 years, the total 24-year life of the Grumman postal van will produce cost savings estimated at $5.9 billion."

Huebner told the audience that Grumman has been building trucks since 1946. "We have produced over 200,000 aluminum truck bodies — far more than any other manufacturer in the world. Some of those truck bodies built in the '40s are still around. That's because we build trucks to last," he said.

Focus Of Attention. *At the U.S. Postal Services' headquarters in Washington, D.C., Postmaster General Preston Tisch welcomed the first Grumman LLVs into the fleet. 'It represents the culmination of a long, arduous search for a significant improvement in the manner in which we deliver mail,' he told attendees at the acceptance ceremony. Grumman Vice Chairman of Development Dan Huebner (C) and Robert St. Francis, director of the Office of Fleet Management for the Postal Service, also spoke.*

Grumman was the only one of three competitors to pass the Postal Service's 24,000 mile endurance test.

"Everything we have incorporated in the postal van was designed to provide the most reliable vehicle, so the Postal Service could provide the best possible service," he said.

Tisch pointed out that the LLV was the first vehicle to have been built to the Service's exact specifications and design requirements.

"Because of the changing dynamics of the mails," Tisch said, "we needed a new workhorse that would meet our needs as well as the Jeep and other vehicles we have used over the years."

The Service wanted a vehicle with more space, because this year mail carriers will deliver some 155 billion pieces of mail, twice what they handled in 1967. The growing amount of mail has forced mail carriers to take extra trips in the delivery vehicles.

The Postal Service wanted fuel economy, too, since a penny increase in a gallon of gas costs them $3 million. The Grumman LLV gets 23 miles to the gallon.

The body is built to last 24 years — three times the life of current vehicles. The Postal Service will not need to make a huge capital investment every eight years to replace its worn-out fleet.

"The children of the drivers here could one day deliver the mail in the year 2011 using the very same vehicle their father or mother is driving today," said Tisch. "That is the kind of long-range thinking that went into the development of this project."■

That Was Then, This Is Now. *At the LLV acceptance ceremony in Washington, Postmaster General Preston Tisch (R) and Grumman Vice Chairman Dan Huebner pointed out that the LLV is the first truck designed specifically for the Postal Service. On display at the Postal Services' headquarters were LLV predecessors: a 1929 Ford Model AA, a turn-of-the-century, horse-drawn delivery wagon and a Jeep. (Photos by Bob Settles)*

What's Inside

Grumman Reports 1st Quarter Results - Pg. 2

Stuart To Get New Office Building - Pg. 3

Data Systems Offers Solutions To C^3I Jobs - Pg. 3

An International Venture: Grumman And Singapore - Pg. 4

Take A Bow - Pg. 6

Grumman Reports 1st Quarter Results

First quarter sales and net income increase

On Monday, May 4, Grumman reported 1987 first quarter net income of $21 million or 60 cents a share on sales of $852.2 million. For the first quarter of 1986, net income was $20.3 million or 64 cents a share on sales of $826.1 million. Net income was up three percent while per share earnings declined because of a greater number of common shares outstanding.

Operating profits increased by $5 million to $46.8 million, benefitting from the sales increase and a decline in research and development expense. However, interest expense increased by $1.5 million to $12.3 million, and the federal income tax provision was up $2.8 million as a result of the Tax Reform Act of 1986.

The sales increase was due to the U.S. Air Force/Army Joint STARS program and support equipment for the Navy's E-2C and EA-6B aircraft. Sales for the Navy's F-14D and A-6F aircraft development programs decreased $15 million to $110 million. These two programs are under no-profit contracts and continue to be reported on a break-even basis.

As first reported in August of last year, certain technical problems have been identified on the F-14D and A-6F programs which could significantly affect program costs and schedules, as well as the performance of the aircraft. These problems are the subject of intense discussions between the Navy and Grumman. Pending resolution of these matters, the company is unable to determine if or to what extent there will be any attendant loss.

"While our first quarter net income was up, we expect net for the entire year will be down from last year's $78.7 million due to the revenue decline anticipated in the aerospace segment," said Grumman Chairman Jack Bierwirth.

"Our business base continues to grow. Funded backlog is at a record $7.2 billion. In the first quarter, we were awarded a $302 million contract from the U.S. Air Force's Space Division for further development of the Boost Surveillance and Tracking System (BSTS) satellite," said Bierwirth. "And the backlog for our Aerostructures Division increased with awards from McDonnell Douglas for work on the C-17 transport and from General Electric for components of thrust reversers used on commercial aircraft engines.

"In April, we delivered the first of 99,150 postal vehicles under the $1.1 billion contract we received last year from the U.S. Postal Service," continued Bierwirth. "We will deliver 8,000 vehicles this year and 18,000 annually starting in 1988."■

The Heat's On. *At the Tachonics facility in Plainsboro, New Jersey, process engineer Wajid Rizvi loads gallium arsenide wafers into an electron beam evaporator. Inside, the beam heats a crucible of metal until the metal evaporates and coats itself to the wafers. Later, a 'lift-off' process removes metal not needed for the circuitry. (Photo by Rich Breunig)*

Tachonics Signs Pact To Produce Gallium Arsenide Circuits

Tachonics Corporation and California Micro Devices Corporation have joined forces to produce high speed, application-specific integrated circuits (ASICs) from gallium arsenide.

Tachonics, an affiliate of Grumman's Electronics Systems Division, produced its first gallium arsenide integrated circuits last November. Under this contract, Tachonics will provide processing and manufacturing expertise for the ASIC gate arrays, while California Micro Devices will provide the cell design and software tools. Prototypes should be ready in the fall, with production starting next year.

"The products that we develop could go into signal processing and radar systems, high performance computers, and high frequency data transmission systems," says Steve Goodspeed, Tachonics vice president — Digital Circuit Design.

California Micro Devices has worked with other companies to make and sell semicustom, silicon-based circuits. The company turned to Tachonics when it wanted to market gallium arsenide gate arrays. This advanced material, which is just beginning to be used by computer manufacturers, is highly resistant to radiation and allows for processing information at higher speeds.

Gate arrays are small, standardized logic circuits — building blocks for product designers. "Gate arrays are attractive because they have a fixed, well-defined architecture, which makes it relatively easy to develop software and use," says Goodspeed. "There is a lot of commonality built into them and they have a relatively low cost compared to custom circuit designs."■

Unit Values

It usually takes several weeks to formulate Grumman Employee Investment Plan unit values. Investment Plan members can call Ext. (111) 54400 (outside Grumman, call 516-575-4400), for a recorded message which is made as soon as the new unit values are available.

New Assignments

A number of new assignments were recently announced in Grumman's Personnel Department:

Ron Anders has been named director of Compensation and Records; Frank Campbell, director of Personnel Relations and Services; Kathy Chew, director of Employee Benefits; Rich Friedel, director of Field Administration, Travel Operations, and Systems; Joelyn Iannone, director of Training and Motivational Programs; and Bill Kelley, director of Employment and Career Development. All report to Bob Foster, director of Personnel.

Chappell To Address PAC

Annual Political Action Committee meeting set for May 18

The annual meeting of the Grumman Political Action Committee (PAC) will be held Monday, May 18 at 4:30 p.m. in the Building 4 hangar in Bethpage. All Grummanites are invited to attend the PAC meeting.

Guest speaker will be U.S. Representative Bill Chappell (D-Florida). He is chairman of the House Defense Appropriations Subcommittee. Grumman St. Augustine Division resides in his congressional district.

Members of the Long Island delegation will also be in attendance: Congressmen Tom Downey, George Hochbrueckner, Norm Lent, Ray McGrath and Bob Mrazek.

Grumman World — Vol. 6, No. 9, May 8, 1987. Published twice a month for active and retired employees of Grumman Corporation. 1111 Stewart Ave., Bethpage, N.Y. 11714. W.B. Jones, Vice President-Public Affairs.

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Grumman C³I Workstation: Defense That Dazzles

McLEAN, Virginia — At the touch of a button, the Grumman C³I Workstation comes alive with a vividly colored map of Polynesia. Press another, and the screen zooms in to a detailed map of Hawaii.

The C³I (command, control, communications, and intelligence) Workstation is the brainchild of the crew at Grumman-CTEC here in Northern Virginia. Its razzle-dazzle maps are a way of communicating an up-to-the-minute, detailed report on U.S., friendly, neutral and hostile forces, gleaned from both human and electronic gumshoes all over the world.

A team of Grummanites recently installed the first product derived from the workstation. This integrated decision support system will be used by the Air Force's Pacific headquarters in Hawaii.

CTEC was acquired by Grumman Data Systems in 1984 to tap the growing C³I market. C³I systems help military and government leaders gather and evaluate information about enemy and friendly forces, and, in turn, issue orders. Such systems consist of a highly sophisticated computer network linked to virtually the entire range of military electronics.

C³I links elements of automation at the squadron level — such as airborne early warning technology — and acts as an information pipeline all the way up the ladder. As such, C³I helps the military get the most from its technological investment.

"C³I helps decision makers determine a number of factors: Are we ready for combat? In what areas are we deficient? Where are enemy forces, and where are their weaknesses? How extensive is the radar coverage for each squadron?" says Rich McLean, chief software engineer at Grumman-CTEC. "This workstation displays the location of hostile, neutral, and friendly forces. This information helps the commander decide where to employ forces."

Grumman markets the C³I Workstation as a complete hardware/software package. The hardware is "off-the-shelf," meaning the hardware is commercially available: a Digital Equipment Corporation or Tektronix color-graphics terminal, a DEC Micro 2 VAX minicomputer, disk drive, tape drive and a color copier. The Grummanites developed the software and integrated the system — in essence, tying everything together.

The Grumman C³I Workstation can gather information in painstaking detail: one display, developed for a Navy prototype C³I system, lists the missiles aboard each fighter on a carrier, and their ranges. Perhaps more important, this system can delete information that's of no use. Decision support software lets a commander pose questions and get a list of alternatives and their drawbacks.

The Grummanites at CTEC have been building decision support systems for over a decade, via research-and-development as well as government contracts. Recently, the Grummanites developed and began to market the C³I Workstation.

The first new customer is the Air Force Commander-In-Chief—Pacific (CINCPACAF). While further communications capability for the workstation is still under development at Grumman-CTEC, several Tektronix terminals will be installed in Hawaii. When the communications software is added, this network will be able to communicate with countless other computers worldwide, at headquarters, bases, field sites, and even aircraft.

One of its first tasks will be providing the commander-in-chief with daily status reports on unit readiness, the enemy threat, the best defense alternatives, and any other compelling issues.

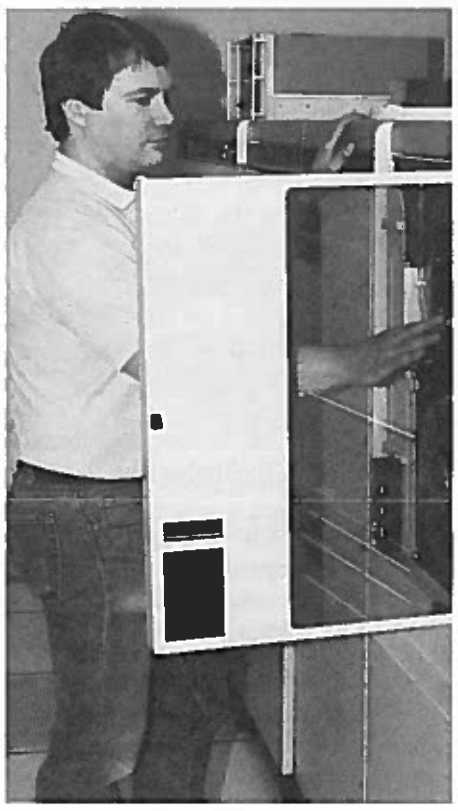
In addition to the Air Force and the Navy, the Coast Guard has indicated interest in the C³I Workstation as a maritime defense command-and-control system. The Navy has transferred to the Coast Guard responsibility for patrolling the Maritime Defense Zone, which includes all U.S. waters from the coastline out 200 miles. This is a new role for the Coast Guard, so it is looking to upgrade its command-and-control systems.

Another potential customer: IPAC, which stands for the Intelligence Center-Pacific. This is a multiagency group that monitors the Pacific Ocean, assisting the armed forces.

"These potential customers have hundreds of command sites among them," notes Bruce Levy, senior vice president at Grumman-CTEC. "The C³I Workstation would be a logical addition to any of those."

Besides defense agencies, C³I has uses in law enforcement, and in the financial and insurance businesses. Also, since the DoD and the branches of the services would like to provide C³I capabilities in tomorrow's aircraft, data and electronics systems, one of the big customers for Grumman-CTEC's expertise may be Grumman.

"A lot of other areas of Grumman are now utilizing the skills we have in high-tech software development," Levy says. "We're improving Grumman's overall capability to win new work. If Grumman can use our skills to bid on new types of work, then we're a valuable asset."■



Off The Shelf. *Rich McLean and Janine Vercoe (above) call up a display of Japan on a C³I Workstation, while Steve Jones (R) loads a tape in Grumman-CTEC's Central Computing Facility. The Workstation is made up of commercially available hardware.*

New Stuart Offices Will Free Production Space

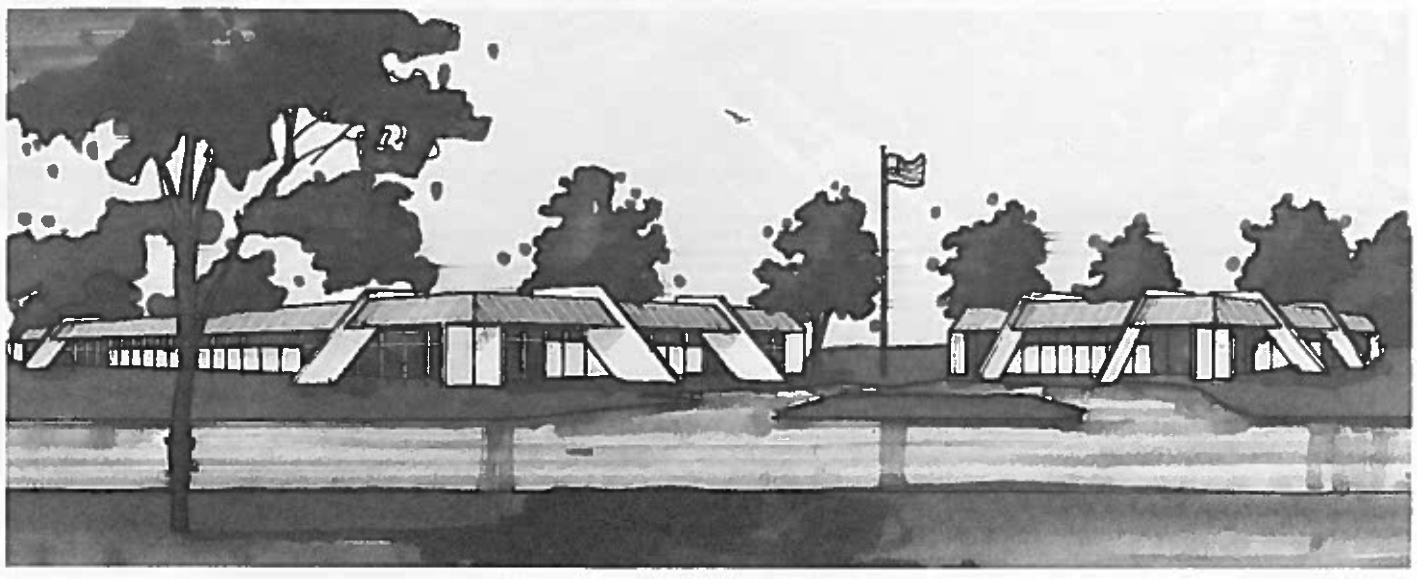
Construction will begin shortly on two administrative buildings at Aircraft Systems' Stuart Operations in Florida. The buildings should be completed in six months.

"We'll be reclaiming a lot of good manufacturing space," says project engineer Vinnie Addamo of Facilities Engineering.

The larger building will house people in support services, such as Manufacturing Planning. Their current offices are spread throughout the manufacturing areas. This building will also have a public access to Personnel, Insurance, Procurement and the Credit Union and Flight Shop.

The smaller building will be the new home of the Defense Contract Administration Services Plant Representative's Office. Similar to the Navy's NAVPRO team on Long Island, this group is the government's representative overseeing the Department of Defense programs at Stuart.

"Right now they're living in old trailers that we shipped to Stuart not long after we activated the site," says Addamo. "The trailers have done their job, but they're in bad shape and are a tremendous maintenance headache."■



Stuart's Newest Addition. *Above is an artist's rendition of the two new administrative buildings under construction.*

An International Venture: Grumman Helping To Teach High Tech To Singaporean Youth

"This is how a country succeeds," Singapore's Prime Minister, Lee Yuan Kew, tells his people. "You pick winners. You concentrate on those items, on those skills, on those products, which will sweep the marketplace."

Guided by those words, this city-state on the tip of the Malay peninsula has picked many winners as trade partners. One of them is Grumman: A computer assisted design and manufacturing (CAD/CAM) center, installed by Grumman Data Systems, is one of the showpieces of Singapore's brand-new Nanyang Technological Institute.

The center is called GINTIC, short for Grumman International-Nanyang Technological Institute CADCAM center. The Institute, which had its grand opening a few months ago, is a critical player in Singapore's economic game plan.

NTI was established by an act of Singapore's parliament in 1981, accepted its first students in mid-1982 and began construction of a brand new, $100 million complex in September, 1983. Today it boasts a student body numbering 2,200.

"Singapore's goal is to become the brains of Southeast Asia. Its biggest resource is its people," says Jim Boyd, a 32-year Grummanite and director of GINTIC. "The importance of this engineering school to the nation was underscored by the presence of the prime minister, the president of the Republic and members of the cabinet at the opening ceremonies."

GINTIC is part of a $45 million industrial cooperation program resulting from Grumman's sale of E-2C Hawkeyes to Singapore. This is similar to an offset program. When a foreign country makes a major purchase of military equipment from the U.S., there is some price offset, a reciprocal purchase or trade of goods and services, or an industrial cooperation program.

'Singapore's goal is to become the brains of Southeast Asia.'

"With most international sales this is a quid pro quo requirement...a necessary tool in today's international market," says Mario Boltri, director of Offset Programs for Grumman International. "Any sale is practically impossible without some form of mutually agreeable offset program."

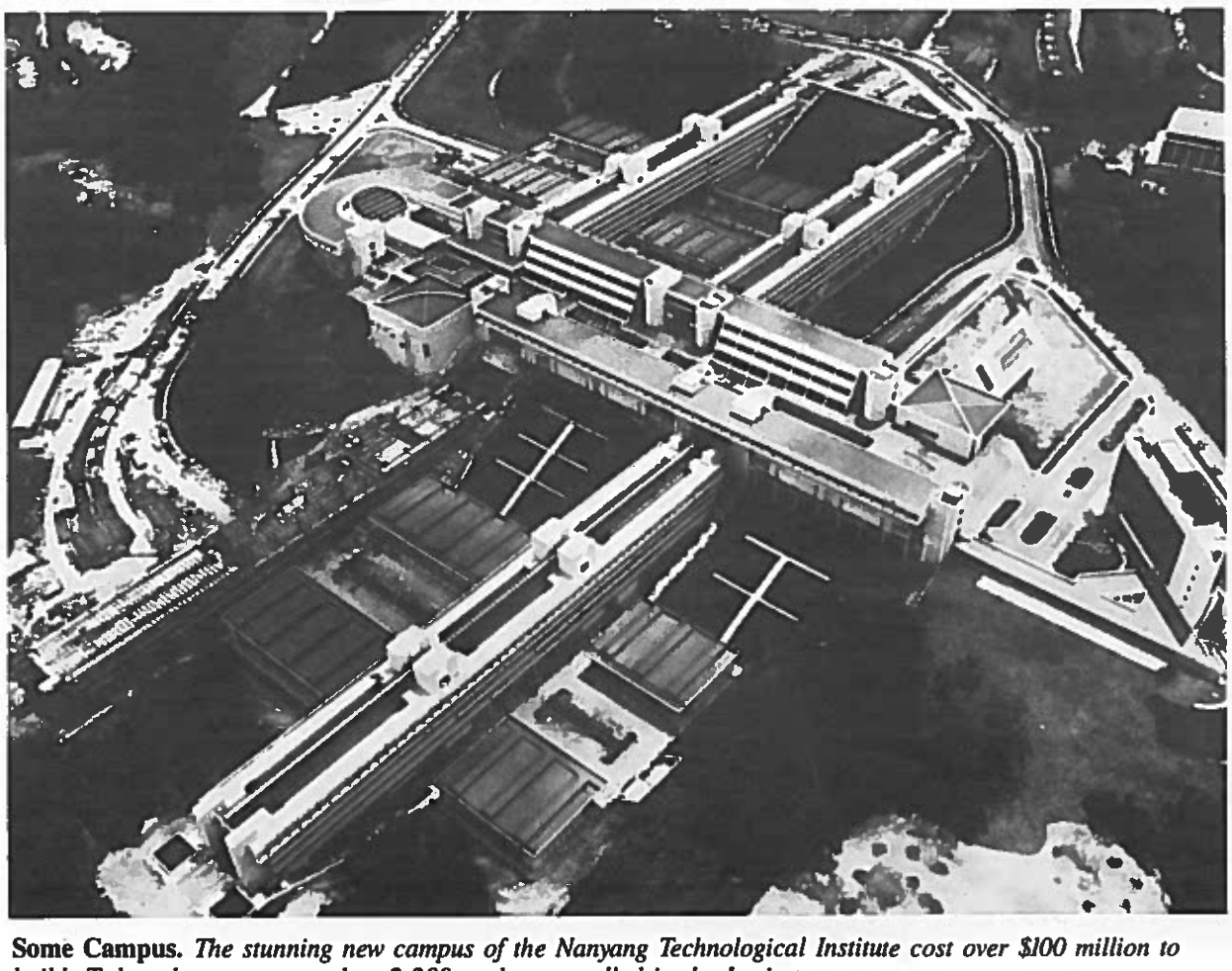
For instance, when Israel bought E-2C's, Grumman acquired computer-room flooring, carpeting, and office chairs — most of which are in the new Headquarters building. For the Singapore sale, however, Grumman had to take the technology-transfer route: Singapore did not have a product that Grumman could import for use or resale.

GINTIC grew out of talks between Grumman International and Singapore's Economic Development Board in 1983. The Nanyang Technological Institute sought an American firm to help it establish an industrial software development center. It was an ideal opportunity and so GINTIC was begun in early 1985.

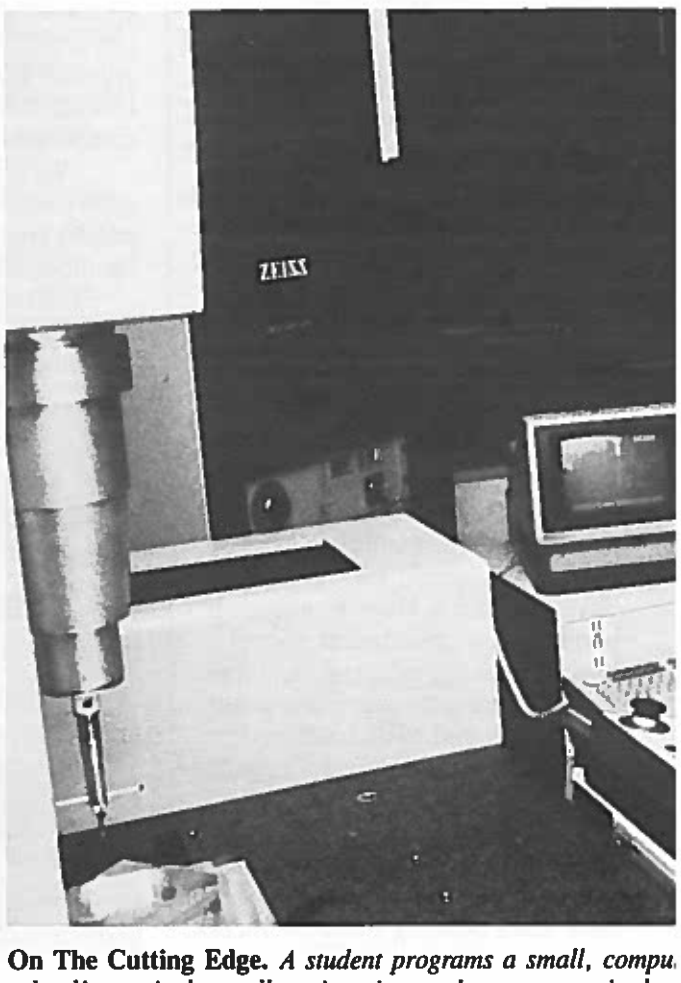
"Singapore wanted to establish a center of excellence," says Boyd. "GINTIC performs several functions. It educates students, it has a software development capability and it is integrated with other schools and with industry. Ultimately, Singapore expects it to help improve the economy. The country places a high priority on cooperation between education and industry."

The center is being equipped with essentially what Grumman has built in Bethpage for its own manufacturing software development needs — though on a much smaller scale. There will be a manufacturing center, a vertical machining center, five-axis machinery, distributed numerical control capability, automated assembly and inspection and artificial intelligence capability. GINTIC's computer systems include an IBM central processor, 20 IBM color graphic workstations, 20 IBM

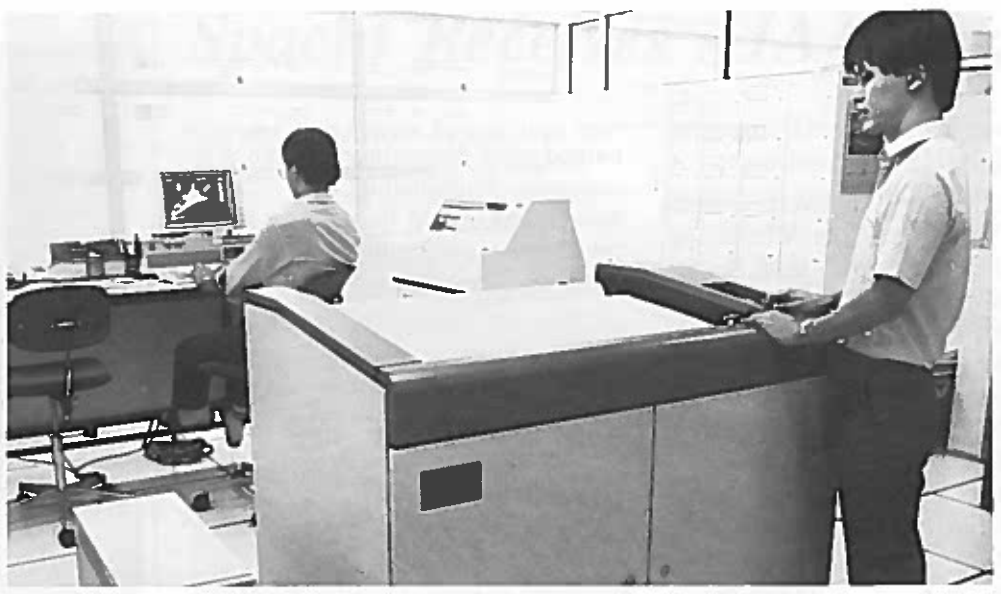
Today it boasts a student body numbering 2,200.



Some Campus. *The stunning new campus of the Nanyang Technological Institute cost over $100 million to build. Today, there are more than 2,200 students enrolled in the Institute.*



On The Cutting Edge. *A student programs a small, compu school's curriculum, all engineering students are required to*



Learning By Doing. *Students at the Singapore's Nanyang Technological Institute are learning to design parts and program automated manufacturing machines on computer systems very similar to what Grumman engineers use in the States.*

Personal Computer/AT's, and some manufacturing machinery. It's all linked to the Institute's computer center.

"The design center is complete and the manufacturing center is just being installed," says Boyd. "We provided the financing for much of the computing equipment, some software and 70 man-months of expertise to set up the system. It will be the most powerful system in Singapore and, in the educational area it will be one of the most powerful in the world."

The 70 months of assistance includes the services of Boyd and communications specialist Hank Clausen, as well as help from Grumman manufacturing and computer software specialists as they are needed.

In addition, the program needed the help of several departments in the Aircraft Systems and Electronics Systems divisions. They had to host nine Institute professors for six months and give them a first-hand look at what Grumman does in CADCAM here in the United States. The professors' six-month training sessions are structured like the summer student program at Grumman. These professors, all of whom have master's degrees if not doctorates, worked at Grumman as engineers at ongoing projects. Five

Singapore will derive years of benefit from GINTIC.

have finished their six-month programs, two are taking them now, and two more will start soon.

"All of these guys are good," says Aircraft Systems' Ed Donohue. His group, Advanced Machining Concepts, worked with Professor Ho and Professor Yiap. Among other things, the group is developing post processors that take geometric data for parts and generate the commands that drive machine tools in Bethpage.

Other professors worked for Aircraft Systems in Buildings 14 and 35 in Bethpage, Electronics Systems in Great River, and a variety of Data Systems sites.

Singapore will derive years of benefit from GINTIC - and it's an excellent accomplishment for Data Systems. But what else is in it for Grumman?

"GINTIC can do research and development in software or applications that would be

'Singapore wanted to establish a center of excellence.'

applicable to Grumman," says Boyd. "Also, I'm talking to people here to see if Grumman can do software development for them."

A more farfetched prospect is the Institute as a source of engineering talent — and as a training ground for young Grumman engineers.

Grumman has also made new ties to Singaporean industry. One example is the qualification of Chartered Electronic Industries as a Grumman supplier. The company makes hybrid integrated circuits.

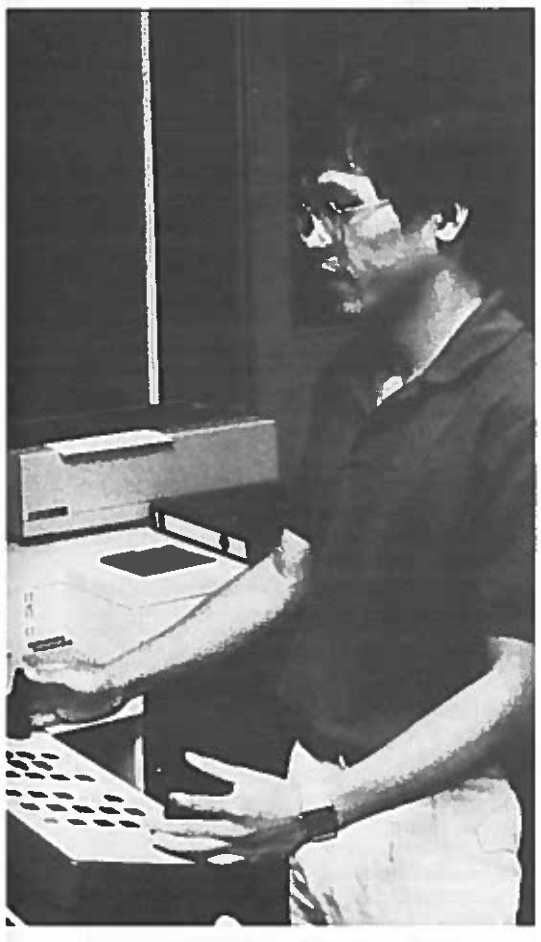
"The qualification took one year," says Boltri. "But now we have put them on our drawings as an approved supplier and we are able to subcontract to them at a reduced cost to Grumman."

In the long run, GINTIC could be a foothold in an increasingly important market — the Southeast Pacific.

"Singapore is the hub of the orient, and one of the fastest growing third-world countries," Boltri says. "In a survey, the magazine *The Economist* found that its 2.6 million people have an annual average income of almost $7,000 — the highest in the developing world outside of the oil states and ahead of Ireland and Israel.

"That area of the world is a very fast developing market for high-tech products, including Data Systems products," he adds. "There's room there for us."■

The Future. *Singapore's greatest asset is its people. These students are learning advanced manufacturing skills that can be used by the larger nations of the Far East.*



ontrolled milling machine. As part of the k six months in industry.

What An Opportunity

Though smaller than New York City, the Republic of Singapore, a sort of midpoint between the U.S. and Europe, is one of the world's largest ports. It's also a long way from home for Jim Boyd, director of GINTIC.

"Now I know what jet-lag is," he says. It takes 24 hours to fly 17,000 miles back to Long Island to visit his sons or confer with Grummanites here...and 27 hours to return.

Nor is it easy to phone home. The time there is 12½ hours ahead of Bethpage, so Boyd makes most of his calls at night.

Boyd and his wife, Alice, live in a brand-new complex of apartments on the Nanyang Technological Institute campus. Though they miss family and friends back in the States, they've developed a fondness for their temporary home in Singapore. Just two degrees north of the Equator, it's always shirt-sleeve weather in Singapore.

"The environment is modern and it's one of the cleanest cities I've seen," says Boyd. "The people are very friendly. We started to make friends with the local people because we wanted to know what Singapore was all about." Native-born friends are especially important in a nation where Chinese, Malay, and Tamil are official languages, in addition to English.

While the language of a menu may sometimes be a problem, the food itself is not. "We could get McDonald's hamburgers or Kentucky Fried Chicken — though rice is served instead of mashed potatoes," he notes. "But why would you want to? The native food is absolutely fantastic. And it's the right types of food: lots of seafood, chicken, fresh vegetables and fruit. I eat more now than ever and I'm down to 175 pounds."

A trimmer Jim Boyd will be coming home soon, however. His 18-month assignment as director is due to end in October.

Would you like an exotic job like Boyd's? Who knows — there might be a similar opportunity out there that you can find the way Jim Boyd found his: on the Job Opportunity Bulletin.

People

A Big Jump

Grummanite Roy Handwerk recently received a patent for an Attenuating, Extendible Shock Absorbing Strut.

Handwerk is an engineering specialist for Landing Gear/Carrier Suitability in Grumman's Aircraft Systems Division.

His invention, more commonly known as a jump strut, was successfully flight tested in 1985. Handwerk's device makes use of a concept patented earlier by another Grummanite, retiree Dave Gebhard.

Fitted to the landing gear of a plane, the jump strut activates during takeoff and boosts the plane five to 10 feet into the air — enough to achieve lift. That saves over half the length of runway required, and can increase the plane's payload.

Handwerk was issued patent no. 4,637,574 for the jump strut.

The assignee for the patent is Menasco, Inc., of Burbank, California, a subsidiary of Colt Industries that makes aircraft landing gear. Grumman teamed with Menasco in 1985 to build and test the strut.

More Patents

Several other Grummanites recently received patents for their on-the-job inventions.

Madeline Kuless, manager of Capital and Facilities Planning for the Space Systems Division, received patent no. 4,640,114 for an Automated Process for Cold Working Holes. Though she now works in Bethpage's Building 25, at the time the patent was filed, Kuless was in a group doing metals research in Bethpage's Building 12.

Kuless' invention is a manufacturing method. It is in a rudimentary stage, but it could ultimately be employed with an automated rivetting machine. The machine would use sleeves of memory metal — which can expand, then shrink back to original size — to work holes in a material.

Patent no. 4,645,300 was recently issued to Bob Brandstetter, program staff scientist—Systems Sciences for Grumman's Corporate Research Center, Building 26; Nils Fonneland, a radio-frequency engineer in the Optics Lab, also Building 26; and Charles Lindig, an engineer for Optics and Display Equipment Design, Building 35. They came up with a Fourier Plane Recursive Optical Filter.

This invention is a technique for screening out radio-frequency interference. It could eventually have application in any broadband communication system, such as an aircraft's radar.

Brandstetter was also on a team earning another patent, no. 4,597,630, for Self-Derived Reference Beam Holography Using A Dove Prism. The patent was filed in 1979: the other three inventors named on it have since left the company. This method of holography would be used by the intelligence community to identify radio signals.

Snow Business

The Austrian Alps are magnificent to see, especially if the ticket for the view is on someone else.

That's the way it worked out for Doug Orehosky of Electronics Systems in Melville and his brother, Glenn, who works on the E-2C program in Melville. Everything but the airfare was on the Professional Ski Instructors of America (PSIA).

At the end of March the PSIA sent nine part-time American instructors to Austria to learn the latest in high-tech skiing.

The conditions they faced in Austria were truly "difficult." They spent hours on slopes that were often a mile or two wide and miles long, slopes that offered combinations of hard-packed, deep powder and spring granular snow.

"A crowded day there," says Doug, "means a three-minute lift line. Here in the United States the wait is a half-hour." One day they skied 55 miles across six peaks.

"The tough part is keeping up with the Austrians," says Glenn. "They are very fast skiers. And you don't realize how fast you are going because there are no trees to mark you."

"They are very involved with the biomechanics of skiing," Doug explains. "They believe in skiing with as little strain as you can. Here in the States, we have taught students to keep their muscles involved all the time. Slowly, we're getting away from that."

Fun Challenge. *A ski-instructors' association sent Grummanites Doug (L) and Glenn Orehosky to Austria to learn the latest in high-tech skiing. These two part-time ski instructors skied for hours at a time on slopes a mile or two wide and miles long, and all they had to pay was their airfare. They also enjoyed the fact that ski slopes in Austria seemed much less crowded than those in the U.S.*

A Champion Rider

Rodeo champion Mary Dunkin installs dashboards in Kurbmaster trucks at the Grumman Olson plant in Tulare, California.

She is also a member of the Sierra Sundowners, a 16-woman precision-drill team that currently reigns as California state champs. The team has held the title for two years running.

Dunkin has been riding since age nine, when her family moved to California's Central Valley from Los Angeles. "I was a city girl. I didn't want any part of this place," she recalls. "Twice, I tried to walk back to L.A. to be with my friends. My father bribed me into staying and bought me a horse. Later that year, I joined a drill team called the BelAirs. I've been riding off-and-on since then."

It's become a family affair: four of Dunkin's five daughters are in the Rockettes, a junior equestrian team, and her husband also rides.

Precision teams don't put on the bucking-bronco sort of show many associate with the rodeo — though Dunkin also does that type of riding on occasion. Precision drills involve complicated formations, all done at a full run. Show judges watch closely to see that the horses move in syncopation. It requires diligent practice.

And that's not all. The horses are judged on grooming: before a rodeo, they must be showered, brushed, their teeth cleaned, and their horseshoes polished. The horses are then lined up on a white sheet for inspection — if a horse isn't squeaky clean, it all must be done over again.

The sport is somewhat risky; Dunkin must purchase extra medical insurance for herself and her horse. "When horses collide, it's called a wreck," she says. "The worst I ever did was fracture my knee when we hit a fence."

Dunkin has owned as many as six horses at one time; she now has two. Soon, her main stead, Tidy, will be retired. "Arthritis," she explains.

Champion Equestrian. *Grummanite Mary Dunkin has been riding since age nine and now is a team member of the Sierra Sundowners, for two years the California state rodeo champs. Dunkin's husband and four of their five daughters are also horse enthusiasts. Dunkin works at Grumman Olson's Tulare, California, facility.*

She's Number One

Dianne Gatta was named secretary of the year in a competition sponsored by Brevard County (Fla.) Chamber of Commerce and the local chapter of the Professional Secretaries International (PSI).

She is secretary to Vinnie Anella, the deputy director of Procurement and Contract Data Management of Grumman Melbourne Systems.

As one of the semi-finalists, she had to give her opinion of the way different situations were handled — such as the case of the secretary who reported an employee that she caught — for a second time — going through confidential documents in her boss' office.

"I agreed with what that secretary did," she recalls. "And when they asked me what I thought could be done to prevent future occurences I said that, if the employee was lucky enough to still have a job, the employee, the secretary and her boss should have a conference and talk about the problem."

At the Secretary's Day awards luncheon Gatta received a plaque, gifts and gift certificates from local merchants.

Next Edition: May 22, 1987

Ball And Chain. *Bronwyn Payne of Grumman's Fluid Systems Department readies F-14 hydraulic attenuators for shipment from Bethpage's Building 2 to Calverton, Long Island. One of these assemblies gets installed on each of the Tomcat's two engines. The attenuators reduce vibration in the engines' high-pressure hydraulic lines. (Photo by Bob Settles)*

Spacht Receives AIAA Award

Grummanite Glenn Spacht was one of three people who received the American Institute of Aeronautics and Astronautics' most recent aircraft design award.

Spacht, director of Advanced Systems for Grumman's Aircraft Systems Division, shares the award with two other stars of the X-29 Advanced Technology Demonstrator program. They are Col. Norris Krone, whose master's thesis convinced people that a forward-swept-wing fighter was possible, and Col. James Allburn, program manager from 1981 to 1985 of the Defense Advanced Research Projects Agency.

Glenn Spacht

Spacht was Grumman's deputy director for Development on the X-29 project. He was Grumman's most visible standard-bearer through the conception, construction and first flights of America's first "X" plane in over a decade. The aircraft has since achieved over 100 successful test flights.

"Half my job was technical and half my job was convincing DARPA that Grumman was on to something," Spacht says. Yet he is modest about receiving the award, and his role on the program itself.

"It's a very nice award, but at least 500 Grummanites played some part on the program, and that number is probably low," says Spacht. "The program was a success because of them."■

Retirees

On behalf of our fellow workers, *Grumman World* salutes the following Grummanites for their contributions to the company and wishes them well in their retirement. Those who have recently retired are:

Thomas F. Tabosky (2), Salvador F. D'Esposito (106), Patrick J. Lacombe (2), Paule E. Shadlich Jr. (3), Warren D. Shepherd (1), Paul E. Smith (3), Edward R. Solosky (2), Edward J. Stachnik (2), Edward J. Stenchever (14), Ellis Thompson (2), Willard E. Tuthill (3), Henry Dreyer (40), Jacob P. Fass (1), Joseph J. Galia (119), Raymond J. Holland (14), Harold B. Johansen (1), Joseph P. Sweeney (1), Robert P. Wilcox (3), Arthur I. Williams (1), Gerard A. Sims Sr. (1), William Wallace Jr. (2), Cornelius H. Watson (3), William Weaver (14), Arthur H. Meyer (289), Frederick Berger (25), Edward F. Burns (3), Frank V. Caputo (3), Michael A. Ceraso (28), Joseph D'Amico (31), Edward A. McDonnell (3), Benjamin A. Mendes (1), Edward J. Murphy (2), James Peganoff (3), John M. Rigsby (25), Frank Romano (3), Donald Seagraves (2), Georgia Stephenson (2), Robert J. Walsh (3), Kenneth Wendell (35), George T. Steffens (1), Stella Saks (2), Curtis C. VanValkenburgh (35), Joseph J. Weglarz (24), George C. Wiesinger (35), Alex Adamcewicz (30), James H. Bieler (1), Anthony S. Claro (110), Ralph C. Galasso (1), Joseph Lengyel (1), Angelo J. Durante (121), James Emge (1), Richard G. Erdody (30), Alfred F. Falk (28) Bartholemew V. Glowacki Jr. (204) Ralph E. Guion (9), Thomas Holmes (2), Dominick J. Finocchio (17), William Fox (4), Nicholas Genega (121), Benjamin Aleck (5), Frederick J. Assey (9), John A. Barton (2), John J. Becak (2), John Bierschenk (9), Joseph W. Brennan (21), William Brinkerhoff (2), William H. Brown (3), Michael Caruso (2), Stephen L. Dorniak (2), John Haggerty (3), Marlvin E. Heriot (1) Zoltan D. Horvath (1), Joseph W. Hubel (3), Edward G. Kanas (2), Edward F. Keiser (5), Letson J. Kinsley (1), Thomas J. Lane (3), Vincent J. LeBas (9), Joseph Mattera (2), Ralph D. Miccio (2), Michael Montagano (3), Louis Muolo (1), Lawrence L. Negretti Jr. (1), Edward J. O'Rourke (2), William O'Sullivan (2), William Parson (2), Erminio J. Pilla (2), Emory L. Philp (3), Joan J. Reid (2), John R. Russ (2), Frank Sautkulis (1), Donald A. Scheulen (3), Harry Schroder (2), Richard R. Seleska (3) William W. Steibel (9), Jerome Strange (9), Norman Trigg (110), Alexis W. Vogel (2), Robert A. Wagenseil (25), Robert W. Erickson (6), Eileen M. Lane (2) Gasper L. Sala (12), Josephine Monza (35), John J. Minghinelli (2), Ernest A. Kostner (3), Silvio R. Forte (25), John Balke (3), Alex J. Hynna (6), Stephen L. Piraino (77), Leroy Rackley (4), John J. Moylan (35), Allie P. Rogers (1), Ernest E. Eglin (3), Lewis Berkowitz (237), Charles E. Cannon (2), John A. Oberg (31), Simon A. Yogis (5), George E. Lschudi (77), Felix Cusa (77), Vito Buffa (6), Thomas J. Carroll (6), Rocco D. Costantino (7), Daniel J. Eynard (7), Frank Jackalone (6), Stephen Petrokiewicz (6), Charles A. Steinbrenner (7), Wallace J. Zober (6), William Vassilious (3), Matthew M. Volpe Jr. (121), Grace R. Wagnell (30), William H. Wandelt (2), Russell M. Wilmot (110), Herman Wilson (2), William Wright Jr. (2), Harry Youngs Jr. (2), Edward Zbikowski (2), Samuel Martin (2), Paul A. Anbro (289), Howard Albert (18), Rita Geyer (121), Gerald J. Gottlieb (35), Dino Guarino (2), Emanuel F. Gumbs Jr. (2), Normandie E. Hardy (2), Edward G. Johnson (3), Peter W. Kaiser (2), George Katz (2), James E. Kavanaugh Jr. (12), August A. Krastel Jr. (1), Melvin M. Lagner (1), Vincent Marconi (1), Frances Masciello (4), Edward J. McClenin Jr. (5), Doris McGrath (30), George F. McGrath (1), Mark E. Mellinger (35), Edward J. Ostrosky (1), Jean Pailet (35), Frank J. Pascale (3), George A. Pavlicin (30), Hilda Perez (3), William C. Pierce (2), Vito Posa (3), Frank J. Powell (3), Angelo J. Proscia (2), Theodore Pupilla (3), Julius Rago (2), Stanley R. Rakowski (112), John W. Sabisch (2), Bruce N. Tuttle (GHQ), Joseph G. Odermatt (1), Carmine DiMare (6), Robert S. Farrant (6), James Seto (5), Charles F. Ballweg (5), Fred Barth (28), William J. Blyman (5), Virgilio Cagna (2), Madeline Claro (28), Gordon E. Honey (5), Dorothy P. Hopkins (5), Albert Lenahan (5), Edward J. Lomot (2), Ralph Marro (5), Reno J. Menichelli (2), William Merrell (5), John Mica (5), Stanley F. Michalowski (1) Amedo A. Missale (1), William M. Mistretta (5), Frances Morgani (2), Edward Moebes (2), Ernest J. Pennino (6), Alfred J. Picone (1), Edward C. Richardson (5), John H. Robedee (5), Donald J. Rogers (35), Francis X. Ruzicka (5), Joseph E. Smith (2), George Starr (2), Erick Stern (25), George A. Werrbach (4), Edward Offner (2), Warren Lipman (2), Alfred Mielczarski (2), Richard A. Duester (3), Erwin Burns (6), Eugene Bailey (7), Frank J. Becker (7), Edward A. Brandt (6), William A. Brehm (6), William H. Brunig (5), Roy V. Butler (6), James J. Chisholm (6), Salvatore Cordaro (6), Charles D. Donges (7), Stanley Duroski (6), Charles Famera (7), John Lang (6), John W. Jabbonsky (6), Louis Eskanazy (220), William H. Keil (6), Walter Kowalsick (6), William L. Luther (6) Henry J. Nazar (6), Richard J. Redding (6), Alexander D. Stefanovich (6), Stanley H. Wojciechowski (6), Jerry Schloss (9), James Geraghty (287), Sidney Leinoff (35), Stanton R. Middleton (2), Alphonsus C. Apuzzo (3), Caroline B. Aubrey (5), Robert L. Bell (10), Emilio Ceribelli (3), Donald Diebel (31), Joseph A. Esposito (237), Stefan Gapinski (5), Frank P. Giordano (24), George J. Grimes (24), William Kozulak (3), Richard Kuhnapfel (24), William Leonhardt (5), Joseph J. Meyer (1), Harold M. Morse (12), William H. Mueller (35), Raymond T. Nannery (1), Joan T. O'Connell (7), Leroy J. Poborsky (24), Leo J. Rogers (10), Frank Sadowski (2), Harold J. Stanley (10).

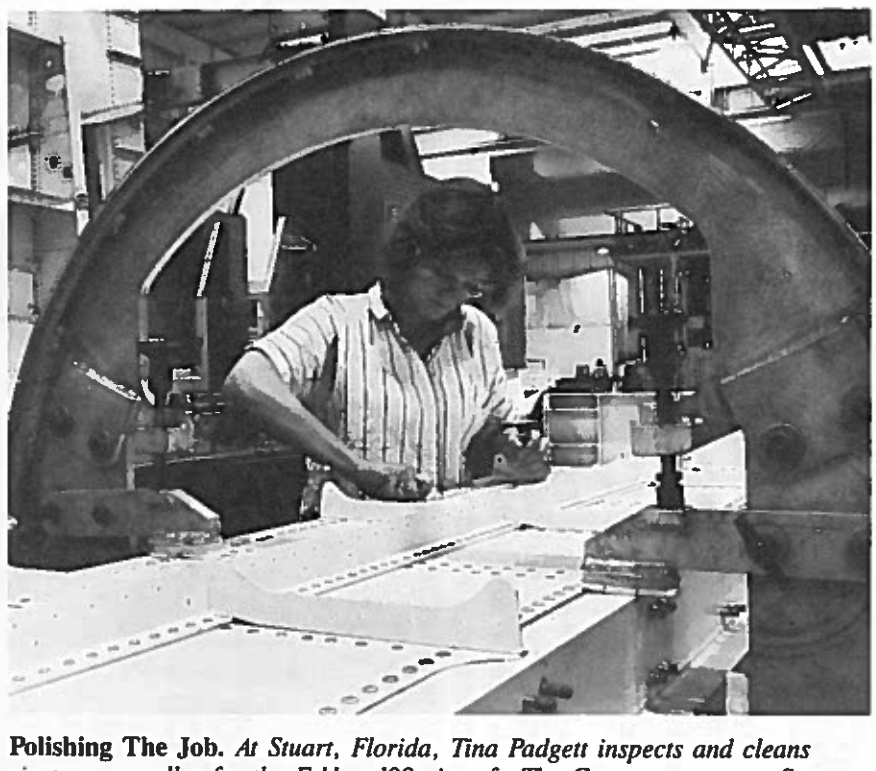
NASA Salutes Three Grummanites

NASA gave three members of the Data Systems Division certificates of appreciation for their work involving the Space Shuttle *Challenger* accident investigation last year.

Two certificates went to members of the division's Engineering Analysis and Data System team at the Marshall Space Flight Center in Huntsville, Alabama: Christopher Black, senior maintenance technician for Grumman Systems Support, and Tom Brister, a senior applications analyst. NASA gave the third award to Dave Englund, an image processing system specialist in Woodbury, Long Island.

The Grummanites helped NASA utilize the EADS system's computing power and image analysis capabilities to analyze photographs and other visuals during the investigation.

Tom Brister and Christopher Black



Polishing The Job. *At Stuart, Florida, Tina Padgett inspects and cleans rivets on nacelles for the Fokker 100 aircraft. The Grumman team at Stuart is building nacelles and thrust reversers for this passenger plane and the Gulfstream G-IV executive jet. Both planes are being equipped with the highly efficient Rolls-Royce Tay engine. (Photo by Jim Ferris)*

Filling You In On PPO Dentists

This year, the Grumman/Travelers dental insurance plan is offering a preferred provider organization (PPO). All eligible Grummanites were mailed a directory of participating dentists earlier this year. This listing has been revised; Employee Services offices have an up-to-date list for your reference.

The dental PPO is a group of dentists who have agreed to a rate structure for their services. For some procedures, a PPO dentist may charge amounts equal to those in the dental schedule of benefits.

You don't have to sign up with the dental PPO. Everyone who belongs to the Grumman/Travelers dental plan gets it automatically. Therefore, you can use a PPO dentist for one procedure, a non-PPO dentist for another, and be covered for both. Your out-of-pocket expenses, however, will be less with a PPO dentist.

Let Us Know

We'd like to know what you think about the things you see in these pages, and what you see going on in the company. Serious comments, questions and complaints are welcomed, and will be answered by the people most qualified to respond.

Letters to the editor should be addressed to *Grumman World*, 1111 Stewart Avenue, A22-GHQ, Bethpage, N.Y. 11714, and should include your name and address.

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GrummanWorld

May 8, 1987

(Photo by Bob Settles)

Taking The Heat

It can get pretty hot inside this shiny cylindrical oven — about 2,000°F, in fact.

In Grumman's Measurement Standards Lab, technician John Reinwald uses the oven to test and calibrate thermocouples. These temperature sensors work by producing an electrical charge, which differs according to temperature, and they can withstand extreme heat and cold. They can act as a measurement device or as part of thermal controls.

At Grumman, thermocouples are used by the thousands, in applications as diverse as heat treatment and air conditioning. They can even be found in airflow ducts, which cool the delicate systems inside Grumman aircraft.

The oven is hooked up to a computer that provides readouts of the charge emitted by two thermocouples: the one tested and one kept in perfect working order. The measurements are compared and the thermocouple is adjusted accordingly.